COASTAL CONSERVANCY

Staff Recommendation
August 5, 2010

SAN FRANCISCO BAY LIVING SHORELINES PROJECT

File No. 10-010-01
Project Manager: Marilyn Latta

RECOMMENDED ACTION: Authorization to disburse a total of up to $300,000 to San Francisco State University and to environmental services contractors to implement the Living Shorelines, a multi-objective subtidal restoration and climate change adaptation pilot project, at up to three sites in San Francisco Bay.

LOCATION: Up to three sites in San Francisco Bay: Corte Madera Ecological Reserve (Marin County), Eden Landing Ecological Reserve (Alameda County), and a site within Eastshore State Park (Alameda County). See Exhibit 1.

PROGRAM CATEGORY: San Francisco Bay Area Conservancy Program

EXHIBITS

Exhibit 1: Project Location Map

Exhibit 2: Project Site Map

Exhibit 3: Conceptual Diagram: Living Shorelines

Exhibit 4: Photographs

Exhibit 5: Project Letters

RESOLUTION AND FINDINGS:
Staff recommends that the State Coastal Conservancy adopt the following resolution pursuant to Sections 31161-31165 of the Public Resources Code:

"The State Coastal Conservancy ("Conservancy") hereby authorizes the disbursement of up to $300,000 (three hundred thousand dollars) of Conservancy funds to implement a multi-objective subtidal restoration and climate change adaptation pilot project, known as "Living Shorelines," in San Francisco Bay. These funds will augment funds for Living Shorelines, previously disbursed under the Executive Officer's delegated authority, and will be disbursed to the following contractors in the approximate amounts that are identified below, which may change, so long as the total does not exceed $300,000:

1. Disbursement of up to approximately $130,000 (one hundred thirty thousand dollars) to San Francisco State University for eelgrass restoration.
2. Disbursement of up to $80,000 (eighty thousand dollars) to one or more environmental services contractors to undertake native oyster restoration activities.
3. Disbursement of the remainder of funds to one or more environmental services contractors for environmental services necessary to implement the project including monitoring of biological (fish, bird, invertebrate interactions with the restored areas) and physical (sediment, wave velocity, shoreline erosion rates) effects of the pilot project."

Staff further recommends that the Conservancy adopt the following findings:

"Based on the accompanying staff report and attached exhibits, the State Coastal Conservancy hereby finds that:

1. The proposed authorization is consistent with Chapter 4.5 of Division 21 of the Public Resources Code, regarding the resource goals of the San Francisco Bay Area Conservancy Program.

2. The proposed project is consistent with the current Project Selection Criteria and Guidelines.

PROJECT SUMMARY:

Staff recommends that the Conservancy authorize disbursement of $300,000 of Conservancy funds to implement a multi-objective subtidal restoration and climate change adaptation pilot project, known as "Living Shorelines," in San Francisco Bay. The disbursement of Conservancy funds will augment the prior disbursement, under the Executive Officer's delegated authority, of $240,000 in federal grant funds for Living Shorelines activities.

The multi-habitat Living Shorelines project integrates subtidal habitat restoration of native oyster and native eelgrass beds with designs that test the use of natural structures to buffer and protect adjacent high priority tidal wetland sites, and areas of the San Francisco Bay shoreline vulnerable to sea level rise and shoreline erosion. "Subtidal" refers to submerged areas below Mean Low Tide in San Francisco Bay.

A large percentage of the San Francisco Bay shoreline has been stabilized with hardened structures, such as riprap, breakwaters, seawalls, and bulkheads to create dry lands for development and to prevent or minimize coastal erosion in the estuarine environment. Ironically, hardened structures often increase the rate of coastal erosion, remove the ability of the shoreline to carry out natural processes, and provide little habitat for estuarine species. This has become an increasing concern, with the most current climate change predictions estimating a potential five feet of sea level rise over the next 100 years and increased storm surge frequency and intensity that is projected to cause increased erosion and scouring of wetland and subtidal mudflat areas in an already erosive San Francisco Bay. In addition, there is a worldwide decline of seagrasses and native shellfish, including eelgrass and oysters, related to anthropogenic activities that alter water quality or clarity. Historically, native oysters were an abundant and ecologically important

part of the fauna in West Coast estuaries and an important fishery. Native eelgrass and oysters are foundation species that act as "ecosystem engineers" to support diverse communities of invertebrates, fishes, waterfowl and marine mammals.

The California Natural Resources Agency "Climate Change Adaptation Strategy" has recommended the use of Living Shorelines as an adaptation method to reduce the need for engineered hard shoreline protection devices and to provide habitat functions and values. The "State Coastal Conservancy Climate Change Policy", adopted by the Conservancy at its meeting of June 4, 2009, also recommends implementation of Living Shorelines projects because of the ability of these projects to reduce erosion and trap sediment, allowing for buffering of tidal wetlands and migration of habitats ("estuary rollover). These projects will further the goal of stronger estuarine habitat resiliency, a crucial objective in light of sea level rise and other climate changes that are projected.

Living Shorelines Description: The San Francisco Bay Living Shorelines project is a pioneering habitat restoration project that will integrate subtidal restoration activities with adjacent tidal wetland and creek restoration projects at three locations in San Francisco Bay. The project will restore critical eelgrass and oyster habitat, and pilot innovative designs to create connectivity between submerged areas and adjacent tidal wetlands and creeks; and test alternatives to hard/structural stabilization in a cost-effective and multi-objective project. Living Shorelines utilize a suite of bank stabilization and habitat restoration techniques to reinforce the shoreline, minimize coastal erosion, and maintain coastal processes while protecting, restoring, enhancing, and creating natural habitat for fish and aquatic plants and wildlife (see Exhibit 3: Conceptual diagram). This technique was coined with the term "Living Shorelines" because it provides "living space" for riverine, estuarine, and coastal organisms, which is accomplished via the strategic placement of native vegetation, sand fill, organic materials, and reinforcing rock or shell for native oyster settlement.

This natural bank stabilization approach can be utilized in low- to medium-energy coastal and estuarine environments, as well as in tidally influenced creeks, streams, and rivers. Living Shoreline stabilization is implemented via two methods: (1) soft/nonstructural stabilization that utilizes natural, nonstructural, and biodegradable materials; and (2) hybrid stabilization that utilizes a combination of soft/nonstructural and hard/structural materials.

Living Shoreline projects have been successfully tried and tested by the U.S. National Oceanic and Atmospheric Administration (NOAA) and other collaborating organizations for more than two decades on the East Coast and in areas of the Gulf Coast, and have resulted in increased flood control benefits, shoreline and wetland protection, and habitat restoration and enhancement for fish, mammals, birds, and a wide variety of aquatic species.

Living Shorelines provide the following benefits to both property owners and to flora and fauna in estuarine and coastal ecosystems:

- Preserves, creates, or maintains habitat for aquatic flora and fauna.
- Restores critical feeding and nursery habitat for adult and juvenile fish.
- Provides wildlife access to the shoreline for nesting species of birds.

- Maintains natural shoreline dynamics.
- Creates a natural buffer that absorbs wave energy and reduces coastal erosion.
- Can be less costly than structural stabilization (e.g., bulkheads and seawalls) when implemented in low-energy environments.

The objectives of the Living Shorelines projects are to:

1. Thoughtfully integrate restoration design components to establish Living Shorelines by linking subtidal habitats and their function with adjacent tidal and riparian habitats of regional importance. Collect data on timing, density, and longevity of eelgrass seedling establishment and oyster recruitment densities, native and non-native species use of the eelgrass and oyster beds, and seasonal growth and timing of the restoration treatments in order to increase the scientific data available regarding methods and timing of subtidal restoration in the bay.

2. Implement six acres of in-the-water subtidal habitat pilot restoration- one acre each of native eelgrass beds and native oyster beds at three sites- to increase needed three-dimensional habitat structure and species use in subtidal areas of San Francisco Bay.

3. Design the Living Shoreline projects as a pilot effort to study specific connections between subtidal and tidal wetland habitats, and collect data on how the projects benefit or impact the adjacent habitats, including monitoring of nutrient levels, turbidity, and species use.

4. Use physical monitoring to test the ability of these treatments for future use as an effective climate change adaptation technique to address sea level rise and future upslope habitat migration. Monitoring will include pre and post project monitoring, as well as monitoring plots within the project footprint and control plots, to collect data on wave heights, flow velocities, and sedimentation and erosion rates. This data will help to determine whether eelgrass and oyster treatments can effectively buffer the shoreline edge by stabilizing sediment and reducing wave action, and allow for more resilient plant and invertebrate populations that can provide propagules to establish in areas higher upslope as sea level rises.

5. Implement these pilot restoration projects to complement initial recommendations from the San Francisco Bay Subtidal Habitat Goals Project, and use the results to inform future agency planning, management, restoration design practices, and permit procedures for subtidal habitat projects bay-wide.

Process: The State Coastal Conservancy will disburse EPA and Conservancy funds to design and implement the native eelgrass restoration, native oyster restoration, and biological and physical monitoring tasks for the project. The Conservancy will enter into an agreement with San Francisco State University for the eelgrass design and restoration component, and then select and enter into up contracts for environmental services with specialized experts to implement the native oyster design and restoration, and biological and physical monitoring of the oyster and eelgrass project activities.

San Francisco State University is well-suited to provide science support to the Living Shorelines Project and has successfully managed similar work related to the San Francisco Bay Eelgrass

Restoration Planning Project and the San Francisco Bay Subtidal Habitat Goals Project.

Sites for Living Shoreline Projects: San Francisco Bay is the largest estuary on the West Coast of North America and the Bay Area is home to over seven million people living in 101 cities in nine counties. San Francisco Bay is a designated as a NOAA National Estuarine Research Reserve and National Estuary Program site, a Habitat Area of Particular Concern and contains several State Ecological Reserves as well as the first urban National Wildlife Refuge in the United States. It provides habitat for approximately 23 state and federal endangered species and 105 threatened species. San Francisco Bay is a dynamic, urban, estuarine environment that provides important habitat for fish, waterfowl and other aquatic organisms and wildlife, and also is a valuable commercial and aesthetic resource (see Exhibit 2).

The geographic scope of the Living Shorelines Project is the subtidal regions of three areas of San Francisco Bay (see Exhibit 2), including Corte Madera Ecological Reserve (Marin County, CA), Eden Landing Ecological Reserve (Alameda County, CA), and a site within Eastshore State Park (Contra Costa County, CA).

Corte Madera Bay: adjacent to Muzzi Marsh/ Corte Madera Ecological Reserve
This site is located in the subtidal areas offshore of the Corte Madera shoreline, near to Muzzi Marsh and the Corte Madera Ecological Reserve. These wetlands are experiencing erosion due to wind-wave currents and also ferry wake currents from the Larkspur Ferry. The site is currently the location of a successful .0.5-acre eelgrass restoration project; more than 5,000 shoots of eelgrass now persist at the site. The eelgrass has provided habitat and food resources for multiple species, including Forster's terns, Pacific cormorants, diving ducks, a variety of invertebrate species, and fish. Just north of the site, an additional eelgrass project and a major oyster reef restoration project are in place at the Marin Rod and Gun Club. The Corte Madera shoreline has been surveyed and there is pervasive presence of native oysters in the intertidal areas.

Eastshore State Park: Berkeley North Basin, Albany Beach, or Breuner Marsh
Eastshore State Park was established in 2002 and is jointly managed by California State Parks and East Bay Regional Park District, with funding support from the Conservancy. The park includes tidelands and upland property along 8.5 miles of the eastern shoreline of the San Francisco Bay. The tidelands comprise rich tidal marshes, subtidal areas, and mudflats that extend bay ward from the shoreline including the Emeryville Crescent, Albany Mudflat, and Hoffman Marsh. Much of the existing upland area is the result of fill placement in the Bay west of the historic shoreline.

There are opportunities to link the Living Shorelines Project and enhanced subtidal planning and restoration with multiple future projects that are proposed at Eastshore State Park, including the Albany Beach master plan, Breuner Marsh wetland restoration, Berkeley Meadow/Virginia Shoreline softening project, and the Schoolhouse Creek daylighting project. The area has been the site of several pilot eelgrass and native oyster monitoring and restoration efforts, and these projects can be successfully replicated at additional sites.

Eden Landing pond complex within the South Bay Salt Pond Restoration Project
The Eden Landing Ecological Reserve is the third regional site location for the Living Shorelines

Project. This site historically contained native oyster beds and even commercial oyster farms, but since conversion to salt pond habitat there has been no monitoring of native oyster populations in this area. Now that several of the ponds are planned to be breached back to tidal marsh, there is strong interest by the Subtidal Habitat Goals Project, the South Bay Salt Ponds Project, and agencies such as NOAA Fisheries to conduct increased monitoring and develop better data regarding the oyster and eelgrass resources and restoration potential in this area. Several patches of eelgrass exist offshore from Eden Landing, and this project would monitor the existing population footprint and analyze the best conditions for installing an eelgrass seed buoy and oyster reef project either outboard of the ponds, or within ponds that will be restored to tidal marsh. This site experiences severe impacts and erosion from winter storm surges and year round winds. Installation of a Living Shorelines Project in this area has the potential to reduce wave fetch, protect the existing Whale's Tail Marsh and the Eden Landing Salt Pond Complex, and enhance fisheries habitat for steelhead and other fish that migrate down Old Alameda Creek.

Project History:
The Living Shorelines Project is part of a continuing effort by the Conservancy and the Ocean Protection Council (OPC) to promote long-term management and restoration of subtidal habitat in the San Francisco Bay. In June 2005, the OPC authorized funds for San Francisco Bay eelgrass and native oyster projects, and in January 2006, the OPC designated the San Francisco Bay Subtidal Goals Project as a high priority for ocean conservation and requested funding by the Conservancy to study and prepare a report identifying threats to the Bay ecosystem, and develop restoration and research priorities. The final report will be completed in November 2010.

The Living Shorelines Project will complement the Subtidal Goals Project and the Baylands Goals Project (prepared by the U.S. Environmental Program Agency, State Water Resources Control Board and completed in 1999), as well as the Conservancy-funded Upland Habitat Goals Project, an on-going effort to develop a comprehensive, long-term management vision for the San Francisco Bay Area.

Research and planning for restoration of the bay's eelgrass and native oyster habitats is on-going and the current interagency San Francisco Bay Subtidal Habitat Goals Project is using this work as the basis for science-based planning to develop an integrated vision of the goals for the amount and location of the various subtidal habitats in the bay. The Final Subtidal Goals Document is projected to be completed November 2010, and this proposed suite of in-the-water Living Shoreline projects would be part of the first pilot implementation efforts of these recommendations. The project will experimentally test a coordinated approach to restoration and enhancement projects of subtidal habitats in San Francisco Bay, and *better integrate them both geographically and functionally to adjacent critical suites of habitats* along a full gradient from uplands down to the bay- including tidal wetlands, salt ponds, riparian creek corridors, and submerged subtidal habitats.

PROJECT FINANCING:

Coastal Conservancy	$300,000
EPA	$300,000
WCB (future proposal)	$400,000

Total Project Cost **$1,000,000**

The U.S. Environmental Protection Agency (through the Association of Bay Area Governments) has provided a grant to the Conservancy in the amount of $300,000. These funds were awarded specifically for planning, design, and implementation of eelgrass and oyster restoration that will occur at the Corte Madera project site. Of these funds, the federal grant authorizes $240,000 to be disbursed for the native eelgrass and native oyster planning, design, permitting, and implementation at the Corte Madera site. This amount has been disbursed to San Francisco State University and additional consultants under the Executive Officer's delegated authority. The federal grant permits the remainder of the grant, $60,000, to be used to offset costs incurred by the Conservancy staff.

As proposed, the Conservancy will provide an additional $300,000 of Conservancy funds for these same activities at the Eastshore State Park site. In addition, Conservancy staff plan to submit a future proposal to the Wildlife Conservation Board for $400,000 for the same activities and additional monitoring at the Eden Landing Ecological Reserve site, to complete the project.

It is anticipated that the Conservancy's funding will come from an appropriation to the San Francisco Bay Area Conservancy Program from the "Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006" (Proposition 84). This funding source may be used for the protection of bays and coastal waters, including projects to protect and restore the natural habitat values of coastal waters and lands, pursuant to the Conservancy's enabling legislation, Division 21 of the Public Resources Code. The proposed project serves to restore natural habitat values of the San Francisco Bay watershed. In addition, as discussed below, the project is consistent with Chapter 4.5 of Division 21.

Proposition 84 also requires that for restoration projects that protect natural resources, the Conservancy assess whether the project meets at least one of the criteria specified in Public Resources Code Section 75071(a)-(e). The proposed pilot project satisfies three of the specified criteria in the following respects. The proposed project will test the effectiveness of restoration designs that will facilitate wildlife movement and botanical transfer between subtidal areas, tidal wetlands, and the shoreline and the site locations will increase linkages to existing protected areas (State Ecological Reserves at Corte Madera Marsh and Eden Landing and Eastshore State Park) (§75071(a)). The three properties which are proposed for restoration support relatively large acreages (1-2 acres) of critical submerged aquatic vegetation (native eelgrass) and shellfish bed (native oyster) habitat types (§75071(c)). The proposed project includes a matching contribution of $300,000 in federal dollars (§75071(e)).

Proposition 84 funds may also be used, as proposed here, for planning need to implement projects authorized under Proposition 84. Public Resources Section 75072 provides: "Up to 10 percent of funds allocated for each program funded by this division may be used to finance planning and monitoring necessary for the successful design, selection, and implementation of the projects authorized under that program. This provision shall not otherwise restrict funds ordinarily used by an agency for "preliminary plans," "working drawings," and "construction" as defined in the Annual Budget Act for a capital outlay project or grant project".

CONSISTENCY WITH CONSERVANCY'S ENABLING LEGISLATION:
The proposed project would be undertaken pursuant to Section 31111 and Chapter 4.5, Sections 31160-31165, of Division 21 of the Public Resources Code regarding resource goals in the San Francisco Bay Area.

Consistent with Section 31111, the proposed project will develop a regional plan for the management, research, and restoration of subtidal habitats in San Francisco Bay.

Under Section 31162(b), the Conservancy may undertake projects and award grants in the nine-county San Francisco Bay Area to achieve the goal of protecting, restoring and enhancing natural habitats of regional importance. Consistent with this section, the proposed project consists of a grant that will result in sound scientific planning and restoration project implementation to help protect, restore and enhance subtidal habitats in an estuary of regional importance within the Bay Area.

Under Section 31163(a), the Conservancy is required to cooperate with the Bay Conservation and Development Commission (BCDC), other regional government bodies, and other interested parties in identifying and adopting long-term resource goals for San Francisco Bay area. The Living Shorelines is one of the first implementation projects to result from a collaborative planning effort involving four primary agencies who developed the San Francisco Bay Subtidal Habitat Goals (Conservancy and OPC, BCDC, NOAA, and the San Francisco Estuary Partnership), as well as academic, governmental, and non-profit parties who contributed to these long-term resource goals for subtidal habitats.

The proposed project is appropriate for prioritization under the selection criteria set forth in Section 31163(c) in that: (1) it is consistent with the San Francisco Bay Plan ("Bay Plan"), as described below; (2) it involves the coordination of several different agencies and many different jurisdictions within the San Francisco Bay Area; (3) it will be implemented in a timely manner; (4) the availability of EPA grant funds and the potential availability ofWCB grant funds to restore subtidal habitat provide an opportunity for restoration activities that could be lost if the project is not quickly implemented; and (5) the proposal includes matching funds through in-kind services provided by NOAA, East Bay Regional Park District, and other staff; and grant funding provided by EPA.

In addition, under Section 31165, the Conservancy may undertake projects and award grants for activities that are compatible with the preservation, restoration, or enhancement of ocean, coastal and bay resources. The recommended grant is consistent with and helps to achieve these goals by providing design, planning, and restoration project implementation for habitat protection, restoration and enhancement projects involving subtidal habitats in the Bay.

CONSISTENCY WITH SAN FRANCISCO BAY PLAN:
The San Francisco Bay Plan ("Bay Plan") was completed and adopted by BCDC in 1968 pursuant to the McAteer-Petris Act of 1965 and last reprinted in January 2007. The Bay Plan guides BCDC's management and permitting decisions in the Bay. The Living Shorelines is

consistent with the following policies articulated in Part III, Findings and Policy Section of the Bay Plan:

> Subtidal Areas Policy 5 (adopted April 2002): "The [BCDC] should continue to support and encourage expansion of scientific information on the Bay's subtidal areas, including: (a) inventory and description of the Bay's subtidal areas; (b) the relationship between the Bay's physical regime and biological populations; …(e) where and how restoration should occur." The proposed pilot projects will assist in implementation of this policy by providing additional data on best techniques for restoration at specific sites, describe the densities, locations, and species associated with subtidal habitats in the Bay, the relationships between aquatic species and their use of subtidal habitats and food webs in the Bay, and priority locations within the Bay for restoration implementation and further scientific study of subtidal habitats.
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> Fish, Other Aquatic Organisms and Wildlife Policy 1 (amended April 2002): "To assure the benefits of fish, other aquatic organisms and wildlife for future generations, to the greatest extent feasible, the Bay's tidal marshes, tidal flats, and subtidal habitat should be conserved, restored and increased." The Living Shorelines Project is consistent with this policy because it will restore and increase subtidal habitat at multiple sites in San Francisco Bay.

CONSISTENCY WITH CONSERVANCY'S 2007 STRATEGIC PLAN GOAL(S) & OBJECTIVE(S):

Consistent with **Goal 10, Objective C**, the proposed project will restore six acres of subtidal habitat.

CONSISTENCY WITH CONSERVANCY'S PROJECT SELECTION CRITERIA & GUIDELINES:

The proposed project is consistent with the Conservancy's Project Selection Criteria and Guidelines, last updated on September 20, 2007, in the following respects:

Required Criteria

1. **Promotion of the Conservancy's statutory programs and purposes:** See the "Consistency with Conservancy's Enabling Legislation" section above.

2. **Consistency with purposes of the funding source:** See the "Project Financing" section above.

3. **Support of the public:** The Living Shorelines is supported by the NOAA Fisheries Restoration Center, BCDC, and the San Francisco Estuary Partnership. The Living Shorelines Project also has broad public support from non-governmental organizations such as Richardson Bay Audubon and others, and from members of the public who have participated in planning meetings. Refer to Exhibit 4 for letters of support for this project.

4. **Location:** The Living Shorelines Project is located entirely within the nine counties that make

up the San Francisco Bay Area, consistent with Section 31162 of the Public Resources Code.

5. **Need:** The proposed project would not occur without Conservancy participation and funding.

6. **Greater-than-local interest:** In creating the San Francisco Bay Area Conservancy Program, the legislature identified San Francisco Bay as the central feature in an interconnected open-space system of watersheds, natural habitats, scenic areas, agricultural lands and regional trails of statewide importance. This project will help develop new research data, and new techniques for restoration of subtidal habitats in San Francisco Bay, and will experimentally test the ability of these treatments to buffer shorelines and protect tidal wetland sites from erosion and sea level rise impacts. These designs can be replicated at additional future sites in San Francisco Bay and in other erosive estuarine areas of the California Coast.

7. **Sea level rise vulnerability:** The proposed projects directly address sea level rise vulnerability by testing natural subtidal restoration designs and their ability to act as natural buffers to protect tidal wetland sites from shoreline erosion, and reduce expected risks and increase resiliency to sea level rise.

Additional Criteria

7. **Urgency:** Without Conservancy funding, the Living Shorelines would not be able to replicate designs across multiple sites to gather the best scientific data about best future Living Shorelines designs for use at additional sites in San Francisco Bay.

8. **Resolution of more than one issue:** The Living Shorelines will help fulfill one of the top five information and research needs identified in the California Ocean and Coastal Information, Research, and Outreach Strategy (adopted by the OPC September 2005) by evaluating specific research needs for the subtidal habitats of San Francisco Bay. The Living Shorelines also implements subtidal habitat restoration and tests new designs that can be applied as potential new climate change adaptation strategies for additional sites.

9. **Leverage:** Matching funds for the Living Shorelines have been provided by EPA and the San Francisco Estuary Partnerships. In-kind services will be provided by a variety of agencies and entities.

10. **Conflict Resolution:** The Living Shorelines will balance protection and enhancement of the subtidal habitats with appropriate use of these habitats. Using a science-based, collaborative process, the project will help resolve conflicts over management of the subtidal habitats.

11. **Innovation:** The Living Shorelines will develop plans for restoration of subtidal habitats, including native oyster and eelgrass beds, which include current, innovative techniques being developed by regional restoration practitioners.

12. **Readiness:** The proposed project is ready to commence upon approval of funding by the Conservancy. The project schedule estimates completion in December 2013.

13. Realization of prior Conservancy goals: See "Project History" section above.

14. Cooperation: The Living Shorelines is a collaborative project involving many agencies. The Conservancy is the lead agency, and partners include EPA, San Francisco Estuary Partnership, San Francisco State University, CA Department of Fish and Game, East Bay Regional Park District, Marin County Department of Parks and Open Space, and many others.

15. Minimization of Greenhouse Gas Emissions The Living Shorelines will make every effort to minimize emissions throughout implementation of the project. As this is a small pilot project, there will be minor vehicle and boat movement to implement the eelgrass and oyster restoration treatments. Work will be completed by local staff, contractors, and community volunteers that live in close proximity to the project locations. Materials and equipment used for the project will be purchased by local vendors. Further, the restored of eelgrass and oyster beds will serve to sequester additional carbon.

16. Vulnerability from climate change impacts other than sea level rise The Living Shorelines will specifically test innovative new adaptation techniques for preventing increased shoreline erosion and scouring from storm surges and increased wind-waves, and study the ability of these natural treatments to better allow for future habitat migration due to estuary rollover.

COMPLIANCE WITH CEQA:

The proposed project is categorically exempt from review under the California Environmental Quality Act pursuant to 14 California Code of Regulations Section 15306, which exempts projects that involve basic data collection, research, experimental management, and resource evaluation activities which do not result in a serious or major disturbance to an environmental resource. The Living Shorelines project is designed as an experimental pilot study to research the most effective subtidal restoration techniques and timing for oyster and eelgrass restoration that may be applied to larger future projects in San Francisco Bay and may lead to future additional action and funding that has not yet been approved. Further, this small pilot project involves one acre each of eelgrass and oyster restoration treatments at the three sites, which represents a fraction of the 250,000 acres of subtidal habitat in the bay. The project includes the placement of eelgrass seed buoys and oyster shell substrate on the bottom at each site, where the bay floor has already been disturbed due to adjacent dredging projects, ferry and boat wakes, and additional stressors. This project builds upon techniques used in previous efforts that have developed methods to reduce bottom disturbance and have documented minimal impacts to resources. Not only does this project have a minimal impact on resources, the restoration outcomes will have a net positive effect on subtidal areas of the bay through the enhancement of foundational eelgrass and oyster habitats that support multiple species of invertebrates, fish, and wildlife; act as a nursery for spawning and rearing of aquatic species; and help to stabilize sediments, reduce wave action, and protect critical wetland sites that have already been identified as regionally important.

Upon approval, staff will file a Notice of Exemption for this project.